

WHAT IS CLAIMED IS:

1. A method of improving the performance of organic conversion coatings, whose primary ingredients are polymeric resins, comprising the steps of

- a. dissolving an organosulfur compound in a solvent,
- b. mixing the solution in which said organosulfur compound is dissolved with a solution in which said polymeric resins are dissolved,
- c. coating a metallic substrate with the mixture of the solutions containing said organosulfur compound and said polymeric resins,
- d. curing the metallic substrate coated with said mixture of the solutions, and thereby increasing the corrosion resistance of said metallic substrate without using chrome.

2. The method according to claim 1 wherein said organosulfur compound is selected from but not limited to alkyl, aryl, and alkyl-aryl thiols, xanthates, sulfides, disulfides, thiocarbamates, dithiocarbamates, thioureas, thiophenols, mercaptopyridines, mercaptoanilines, mercaptoimidazoles, thiophenes, and thiophosphates.

3. The method according to claim 1 wherein said organosulfur compound is an alkanethiol with a general formula $R(CH_2)_nSH$, where R is a terminal group, which can be, but not necessarily limited to H-, NH_2 -, $HOOC$ -, HO -, and n represents the number of hydrocarbons, which can range from 10 to 21.

4. The method according to claim 1 wherein said organosulfur compound is 1-octadecanethiol.

5. The method according to claim 1 wherein said polymeric resins are selected from, but not limited to, acrylic, acrylic-urethane, epoxy, polyester, epoxy-polyester or fluorovinyl polymers, or their combinations.

6. The method according to claim 1 wherein said metallic substrates includes, but not limited to, hot rolled and pickled steel sheet, cold-rolled steel sheet, stainless steel sheet, hot-dipped metallic coated steel sheets, electroplated metallic coated steel

sheets, aluminum sheets and aluminum alloy sheets, zinc sheets, zinc alloy sheets, copper sheets, copper alloy sheets, gold, and silver.

5 7. The method according to claim 1 wherein said metallic substrate includes, but not limited to, coatings of one or more layers of lead, lead alloy, nickel, nickel alloy, zinc, zinc layer, tin, tin alloy, and the like.

10 8. The method according to claim 1 wherein said solvent for said organosulfur compound is selected from alcohols, acetone, turpentine, benzene, ethyl and butyl acetate, toluene, petroleum ester, xylene, alkane, mineral spirit, and water.

 9. The method according to claim 8 wherein a preferred solvent is selected from ethanol, 1-propanol, 1-butanol, and mixtures thereof.

15 10. The method according to claim 1 wherein the concentration of said organosulfur compound in said polymeric resins is in the range of 0.001–0.5 moles per liter, preferably in the range of 0.02–0.05 moles per liter for the case of coating electrogalvanized steel with an acrylic polymer.

20 11. The method according to claim 1 wherein said metallic substrate is coated with said mixture of the solutions containing said organosulfur compound and said polymeric resins by means of a roll or a bar coater, cured at a temperature in the range of 100 to 350°C to obtain a desired coating thickness, preferably in the range of 1 to 2 μm for the case of cold-rolled steel sheets.

25 12. A method of improving the performance of organic conversion coatings, whose primary ingredients are polymeric resins, comprising the steps of

- 30 a. mixing an organosulfur compound with a polymeric resin,
 b. coating a metallic substrate with said polymeric resin containing said organosulfur compound,
 c. curing the metallic substrate coated with said mixture of the solutions, and thereby increasing the corrosion resistance of said metallic substrate without

using chrome.

13. A method according to claim 12 wherein said metallic substrate is electrogalvanized steel.

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14. A method according to claim 12 wherein said organosulfur compound is selected from but not limited to alkyl, aryl, and alkyl-aryl thiols, xanthates, sulfides, disulfides, thiocarbamates, dithiocarbamates, thioureas, thiophenols, mercaptopyridines, mercaptoanilines, mercaptoimidazoles, thiophenes, and thiophosphates.

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15. The method according to claim 12 wherein said polymeric resins are selected from, but not limited to, acrylic, acrylic-urethane, epoxy, polyester, epoxy-polyester or fluorovinyl polymers, or their combinations.